

1 What is claimed is:

2 1. A method for determining the level of fluid in a container comprising:
3 obtaining a container having an outlet for a first fluid and an inlet for a second
4 fluid;
5 said container having a first fluid region therein;
6 a first fluid being present at an original level in said first fluid region of said
7 container;
8 said container, for when in use, having said first fluid at least partially removed
9 from said container thereby forming a second fluid region;
10 placing on at least one exterior surface of said container at least one
11 temperature-measuring device;
12 at least one said temperature-measuring device being located in a region of said
13 container where said second fluid region is formed by removal of said first fluid;
14 initially observing a first temperature in said first fluid region of said container
15 when said first fluid is present in said first fluid region of said container;
16 subsequently observing a second temperature in said second fluid region of said
17 container after a portion of said first fluid has been removed;
18 correlating the difference between said first temperature and said second
19 temperature to the level of said first fluid in said container; and,
20 provided further that the temperature measuring device is based on a member
21 selected from the group consisting of a leuco dye, a clearing point liquid crystal,
22 cholesteric liquid crystal, chiralnematic liquid crystal, and mixtures thereof.

23 2. The method for determining the level of said first fluid in said container
24 according to claim 1 wherein said first fluid is at least partially withdrawn through
25 said outlet between the time of observing said first temperature and said second
26 temperature.

27 3. The method for determining the level of said first fluid in said container
28 according to claim 1 wherein the second fluid is introduced through said inlet
29 between the time of observing said first temperature and said second

30

31

1 temperature.

2 4. The method for determining the level of said first fluid in said container
3 according to claim 1 wherein said second fluid is a gas.

4 5. The method for determining the level of said first fluid in said container
5 according to claim 1 wherein said second fluid is a gas.

6 6. The method for determining the level of said first fluid in said container
7 according to claim 1 wherein said temperature-measuring device is adhered to
8 an outer surface of said container as a magnetic strip.

9 7. The method for determining the level of said first fluid in a container
10 according to claim 1 wherein a plurality of temperature-measuring device are
11 sequentially located in the regions of said container where said second fluid
12 region is formed by removal of said first fluid.

13 8. The method for determining the level of said first fluid in a container
14 according to claim 1 wherein the member comprises one or more of one or more
15 of : leucoauramine, diarylphthalide, polyarylcarbinole, acylauramine,
16 arylauramine, Rhodamine B lactam, indoline, spiropyran, and fluoran; Crystal
17 Violet lactone (CVL), Malachite Green lactone, 2-anilino-6-(N-cyclohexyl-N-
18 methylamino)-3-methylfluoran, 2-anilino-3-methyl-6-(N-methyl-N-propyl-
19 amino)fluoran, 3-[4-(4-phenylaminophenyl)aminophenyl]-amino-6-methyl-7-
20 chlorofluoran, 2-anilino-6-(N-methyl-N-isobutylamino)-3-methylfluoran, 2-anilino-
21 6-(dibutyl-amino)-3-methylfluoran, 3-chloro-6-(cyclohexylamino)-fluoran, 2-
22 chloro-6-(diethylamino)fluoran, 7-(N,N-dibenzylamino)-3-(N,N-
23 diethylamino)fluoran, 3,6-bis(diethylamino)fluoran, gamma-(4'-nitroanilino)lactam,
24 3-diethylaminobenzo[a]-fluoran, 3-diethylamino-6-methyl-7-aminofluoran, 3-
25 diethylamino-7-xylidinofluoran, 3-(4-diethylamino-2-ethoxyphenyl)-3-(1-ethyl-2-
26 methylindole-3-yl)-4-azaphthalide, 3-(4-diethylaminophenyl)-3-(1-ethyl-2-
27 methylindole-3-yl)phthalide, 3-diethylamino-7-chloroanilinofluoran, 3-
28 diethylamino-7,8-benzofluoran, 3,3-bis(1-n-butyl-2-methylindole-3-yl)phthalide,
29 3,6-dimethylethoxyfluoran, 3-diethylamino-6-methoxy-7-aminofluoran, DEPM,
30 ATP, ETAC, 2-(2-chloroanilino)-6-dibutylaminofluoran, Crystal Violet carbinol,
31 Malachite Green carbinol, N-(2,3-dichlorophenyl)leucoauramine, N-

1 benzoylauramine, Rhodamine B lactam, N-acetylauramine, N-phenylauramine,
2 2-(phenyliminoethanedilydene)-3,3-dimethylindoline, N,3,3-
3 trimethylindolinobenzospiropyran; 8'-methoxy-N,3,3-
4 trimethylindolinobenzospiropyran, 3-diethylamino-6-methyl-7-chlorofluoran, 3-
5 diethylamino-7-methoxyfluoran, 3-diethylamino-6-benzyloxyfluoran, 1,2-benzo-6-
6 diethylaminofluoran, 3,6-di-p-toluidino-4,5-dimethylfluoran, phenylhydrazide-
7 gamma-lactam, and 3-amino-5-methylfluoran; 3-Z-4-Z₁-5-Z₂-5-(1-R-2-R₁-5/6-
8 Y-3-indolyl)-2(5H)-furanones; 3,5-bis(1-R-2-R₁-5/6-Y-3-indolyl)-2-(3H)-
9 furanones; 2,4-bis(1-R-2-R₁-5/6-Y-3-indolyl)-4-oxobutanoic acids; 4-(1-R-2-R₁-
10 5/6-Y-3-indolyl)-2,3-dichloro-4-oxo-2-butenoic acids; phenols, metal phenolates,
11 metal carboxylates, benzophenones, sulfonic acids, sulfonates, phosphoric
12 acids, metal phosphates, acidic phosphoric esters, acidic phosphoric ester metal
13 salts, phosphorous acids, and metal phosphites; gallic acid; gallate such as
14 methyl gallates, ethyl gallate, n-propyl gallate, i-propyl gallate, and butyl gallate;
15 dihydroxybenzoic acids and their esters such as 2,3-dihydroxybenzoic acid and
16 3,5-dihydroxybenzoic acid methyl; acetophenone derivatives such as 2,4-
17 dihydroxyacetophenone, 2,5-dihydroxyacetophenone, 2,6-
18 dihydroxyacetophenone, 3,5-dihydroxyacetophenone, and 2,3,4-
19 trihydroxyacetophenone; benzophenone derivatives such as 2,4-
20 dihydroxybenzophenone, 4,4'-dihydroxybenzophenone, 2,3,4-
21 trihydroxybenzophenone, 2,4,4'-trihydroxybenzophenone, 2,2',4,4'-
22 tetrahydroxybenzophenone, and 2,3,4,4'-tetrahydroxybenzophenone; biphenols
23 such as 2,4'-biphenol and 4,4'-biphenol; and polyhydric phenols such as 4-[(4-
24 hydroxyphenyl)methyl]-1,2,3-benzenetriol, 4-[(3,5-dimethyl-4-
25 hydroxyphenyl)methyl]-1,2,3-benzenetriol, 4,6-bis[(3,5-dimethyl-4-
26 hydroxyphenyl)methyl]-1,2,3-benzenetriol, 4,4'-[1,4-phenylenebis(1-
27 methylethyldene)bis(benzene-1,2,3-triol)], 4,4'-[1,4-phenylenebis(1-
28 methylethyldene)bis(1,2-benzenediol)], 4,4',4"-ethylidenebisphenol, 4,4'-(1-
29 methylethyldene)bisphenol, and methylenetrakis-p-cresol; polyalkylene oxide
30 (PAO), Chr-L[PAO-L-Chr]_n where each Chr which may be the same or different
31 is a chromophore, each PAO which may be the same or different is a

1 polyalkylene oxide moiety, each L is a bond or organic linking group connecting
2 at least one PAO to at least one Chr, and n is an integer having a value of at
3 least 1; styrene-methacrylic acid copolymer; polyethylene, chlorinated
4 polyethylene, ethylene-vinyl acetate copolymer and ethylene-acrylic acid-maleic
5 anhydride copolymer, polybutadienes, polyesters such as polyethylene
6 terephthalate, polybutylene terephthalate and polyethylene naphthalate,
7 polypropylenes, polyisobutylenes, polyvinyl chlorides, polyvinylidene chlorides,
8 polyvinyl acetates, polyvinyl alcohols, polyvinyl acetals, polyvinyl butyrals,
9 fluorine resins, acrylic resins, methacrylic resins, acrylonitrile copolymers,
10 styrenecopolymers such as polystyrene, halogenated polystyrene and styrene
11 methacrylic acid copolymer, acetal resins, polyamides such as nylon 66,
12 polycarbonates, cellulose resins, phenol resins, urea resins, epoxy resins,
13 polyurethane resins, diaryl phthalate resins, silicone resins, polyimide amides,
14 polyether sulfones, polymethyl pentenes, polyether imides, polyvinyl carbazoles
15 and amorphous polyolefin.

16 9. The method for determining the level of said first fluid in said container
17 according to claim 1 where said container is present in a location of low humidity
18 at the time of the initial observing of the first temperature in said first fluid region
19 of said container when said first fluid is present in said first fluid region of said
20 container and at the time the subsequent observation of the second temperature
21 in said second fluid region of said container after a portion of said first fluid has
22 been removed.

23 10. The method for determining the level of said first fluid in said container
24 according to claim 1 wherein said first fluid is a liquid.

25 11. The method for determining the level of said first fluid in said container
26 according to claim 1 wherein said first fluid comprises beer and wherein said
27 second fluid comprises carbon dioxide.

28 12. The method for determining the level of said first fluid in said container
29 according to claim 1 additionally comprising the step of applying water to the
30 temperature-measuring device with a water moistened cloth or a spray bottle
31 wherein the temperature of the water applied is from 45 ° F to 80 ° F.

1 13. The method for determining the level of said first fluid in said container
2 according to claim 1 wherein the temperature-measuring device is black color at
3 one temperature and a green temperature at another color.

4 14. The method for determining the level of said first fluid in said container
5 according to claim 1 wherein the at least one said temperature-measuring device
6 operates at a single discrete temperature.

7 15. A fluid dispensing assembly comprising:

8 a sealed container, for when in use, containing a liquid under pressure;
9 said sealed container having an exterior surface;

10 said sealed container having input means for maintaining a constant pressure
11 within sealed container

12 said exterior surface of said sealed container having a heightwise dimension and
13 a widthwise dimension;

14 at least one temperature-measuring device positioned heightwise dimension on
15 said exterior surface, provided further that said temperature-measuring device
16 measures temperatures in the range of about from 45 ° F to 80 ° F; and,
17 provided further that the temperature measuring device is based on a member
18 selected form the group consisting of a leuco dye, a clearing point liquid crystal,
19 cholesteric liquid crystal, and mixtures thereof.

20 16. The fluid dispensing assembly according to claim 15 wherein said input
21 means supplies carbon dioxide to said sealed container.

22 17. The fluid dispensing assembly according to claim 15 the member comprises
23 one or more of : leucoauramine, diarylphthalide, polyarylcarbinole,
24 acylauramine, arylauramine, Rhodamine B lactam, indoline, spiropyran, and
25 fluoran; Crystal Violet lactone (CVL), Malachite Green lactone, 2-anilino-6-(N-
26 cyclohexyl-N-methylamino)-3-methylfluoran, 2-anilino-3-methyl-6-(N-methyl-N-
27 propyl-amino)fluoran, 3-[4-(4-phenylaminophenyl)aminophenyl]-amino-6-methyl-
28 7-chlorofluoran, 2-anilino-6-(N-methyl-N-isobutylamino)-3-methylfluoran, 2-
29 anilino-6-(dibutyl-amino)-3-methylfluoran, 3-chloro-6-(cyclohexylamino)-fluoran,
30 2-chloro-6-(diethylamino)fluoran, 7-(N,N-dibenzylamino)-3-(N,N-
31 diethylamino)fluoran, 3,6-bis(diethylamino)fluoran, gamma-(4'-nitroanilino)lactam,

Hadala Parent SN 09/992,610

Parent filed 19 Nov 01

1 3-diethylaminobenzo[a]-fluoran, 3-diethylamino-6-methyl-7-aminofluoran, 3-
2 diethylamino-7-xylidinofluoran, 3-(4-diethylamino-2-ethoxyphenyl)-3-(1-ethyl-2-
3 methylindole-3-yl)-4-azaphthalide, 3-(4-diethylaminophenyl)-3-(1-ethyl-2-
4 methylindole-3-yl)phthalide, 3-diethylamino-7-chloroanilinofluoran, 3-
5 diethylamino-7,8-benzofluoran, 3,3-bis(1-n-butyl-2-methylindole-3-yl)phthalide,
6 3,6-dimethylethoxyfluoran, 3-diethylamino-6-methoxy-7-aminofluoran, DEPM,
7 ATP, ETAC, 2-(2-chloroanilino)-6-dibutylaminofluoran, Crystal Violet carbinol,
8 Malachite Green carbinol, N-(2,3-dichlorophenyl)leucoauramine, N-
9 benzoylauramine, Rhodamine B lactam, N-acetylauramine, N-phenylauramine,
10 2-(phenyliminoethanedilydene)-3,3-dimethylindoline, N,3,3-
11 trimethylindolinobenzospiropyran, 8'-methoxy-N,3,3-
12 trimethylindolinobenzospiropyran, 3-diethylamino-6-methyl-7-chlorofluoran, 3-
13 diethylamino-7-methoxyfluoran, 3-diethylamino-6-benzyloxyfluoran, 1,2-benzo-6-
14 diethylaminofluoran, 3,6-di-p-toluidino-4,5-dimethylfluoran, phenylhydrazide-
15 gamma-lactam, and 3-amino-5-methylfluoran; 3-Z-4-Z₁-5-Z₂-5-(1-R-2-R₁-5/6-
16 Y-3-indolyl)-2(5H)-furanones; 3,5-bis(1-R-2-R₁-5/6-Y-3-indolyl)-2-(3H)-
17 furanones; 2,4-bis(1-R-2-R₁-5/6-Y-3-indolyl)-4-oxobutanoic acids; 4-(1-R-2-R₁-
18 5/6-Y-3-indolyl)-2,3-dichloro-4-oxo-2-butenoic acids; phenols, metal phenolates,
19 metal carboxylates, benzophenones, sulfonic acids, sulfonates, phosphoric
20 acids, metal phosphates, acidic phosphoric esters, acidic phosphoric ester metal
21 salts, phosphorous acids, and metal phosphites; gallic acid; gallate such as
22 methyl gallates, ethyl gallate, n-propyl gallate, i-propyl gallate, and butyl gallate;
23 dihydroxybenzoic acids and their esters such as 2,3-dihydroxybenzoic acid and
24 3,5-dihydroxybenzoic acid methyl; acetophenone derivatives such as 2,4-
25 dihydroxyacetophenone, 2,5-dihydroxyacetophenone, 2,6-
26 dihydroxyacetophenone, 3,5-dihydroxyacetophenone, and 2,3,4-
27 trihydroxyacetophenone; benzophenone derivatives such as 2,4-
28 dihydroxybenzophenone, 4,4'-dihydroxybenzophenone, 2,3,4-
29 trihydroxybenzophenone, 2,4,4'-trihydroxybenzophenone, 2,2',4,4'-
30 tetrahydroxybenzophenone, and 2,3,4,4'-tetrahydroxybenzophenone; biphenols
31 such as 2,4'-biphenol and 4,4'-biphenol; and polyhydric phenols such as 4-[(4-

1 hydroxyphenyl)methyl]-1,2,3-benzenetriol, 4-[(3,5-dimethyl-4-
2 hydroxyphenyl)methyl]-1,2,3-benzenetriol, 4,6-bis[(3,5-dimethyl-4-
3 hydroxyphenyl)methyl]-1,2,3-benzenetriol, 4,4'-[1,4-phenylenebis(1-
4 methylethylidene)bis(benzene-1, 2,3-triol)], 4,4'-[1,4-phenylenebis(1-
5 methylethylidene)bis(1,2-benzenediol)], 4,4',4"-ethylidenetrisphenol, 4,4'-(1-
6 methylethylidene)bisphenol, and methylenetris-p-cresol; polyalkylene oxide
7 (PAO), Chr-L[PAO-L-Chr]_n where each Chr which may be the same or different
8 is a chromophore, each PAO which may be the same or different is a
9 polyalkylene oxide moiety, each L is a bond or organic linking group connecting
10 at least one PAO to at least one Chr, and n is an integer having a value of at
11 least 1; styrene-methacrylic acid copolymer; polyethylene, chlorinated
12 polyethylene, ethylene-vinyl acetate copolymer and ethylene-acrylic acid-maleic
13 anhydride copolymer, polybutadienes, polyesters such as polyethylene
14 terephthalate, polybutylene terephthalate and polyethylene naphthalate,
15 polypropylenes, polyisobutylenes, polyvinyl chlorides, polyvinylidene chlorides,
16 polyvinyl acetates, polyvinyl alcohols, polyvinyl acetals, polyvinyl butyrals,
17 fluorine resins, acrylic resins, methacrylic resins, acrylonitrile copolymers,
18 styrenecopolymers such as polystyrene, halogenated polystyrene and styrene
19 methacrylic acid copolymer, acetal resins, polyamides such as nylon 66,
20 polycarbonates, cellulose resins, phenol resins, urea resins, epoxy resins,
21 polyurethane resins, diaryl phthalate resins, silicone resins, polyimide amides,
22 polyether sulfones, polymethyl pentenes, polyether imides, polyvinyl carbazoles
23 and amorphous polyolefin.

24